Spectroscopic signatures of crystal momentum fractionalization
ANDREW ESSIN, IQIM and Department of Physics, California Institute of Technology, MICHAEL HERMELE, Department of Physics, University of Colorado Boulder — In spin liquids with fractional excitations, the low-energy edge $\Omega(q)$ of the two-spinon continuum carries information about the single-spinon physics. This physics is accessible experimentally in inelastic neutron scattering, for example, in the dynamical spin structure factor. We show that some types of quantum-number fractionalization in gapped, $Z_2$ spin liquids lead to dramatic signatures in $\Omega(q)$. Notably, it may need to repeat within the first Brillouin zone, which is a direct signature of fractional crystal momentum, remarkable in the absence of symmetry-breaking spatial order.

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